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10/710,539	07/20/2004	Chun-Ming Cho	REAP0087USA	4538

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EXAMINER
SINGH, HIRDEPAL

ART UNIT	PAPER NUMBER
2611	

NOTIFICATION DATE	DELIVERY MODE
12/21/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/710,539	CHO ET AL.	
	Examiner	Art Unit	
	Hirdepal Singh	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/13/07, 11/22/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the Amendment filed on October 12, 2007. Claims 1-26 are pending and have been considered below.

2. The amendment addressed and corrected the informalities in the drawings. Therefore, the objection to the drawings is withdrawn.

3. The amendment corrected the informalities in the specification. Therefore, the objection to the drawings is withdrawn.

Response to Arguments

4. Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-3, 5-7, 9, 10, 12, 14-16, 18-20, 22, 23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awater et al. (US 2005/0152317) in view of Gummadi et al. (US 7,136,436) and further in view of Barton et al. (US 7,227,834).

Regarding Claims 1 and14:

Awater discloses a method and apparatus for detecting a boundary and eliminating the inter symbol and multipath interference in a received stream of sample values (abstract; paragraph 0054) column 5, lines 12-22; column 6, lines 1-6) comprising;

a correlator computing a correlation value between plurality of signals of first symbol and second symbol (figure 5; paragraphs 0037, and 0061), and using two differential correlation values from pair of differential correlators for detecting the signal packets (paragraphs 0040, and 0046-0047) (as clearly stated in claim number 6), and a comparator to determine which one of the correlation value has a higher sum (figure 5; paragraph 0056), and further discloses a controller that receives input from the boundary detection blocks and control different functions (figure4; paragraph 0034).

Awater discloses all of the subject matter as described above except for specifically teaching that (1) the signals are transmitted via same sub-carriers, and the third signal is placed next to the first signal (not previous to first symbol) for calculating second correlation value; and (2) adjusting the timing of boundary according to the comparison result.

However, Regarding item (1) above Gummadi in the same field of endeavor, discloses a similar apparatus and method for boundary detection using multiple correlations, where the received signal is correlate with previous signal and both are transmitted through same channel (column 5, lines 58-67), also the system could be using a multi-carrier or single-carrier technique (column 9, lines 55-65), the correlation value is generated by comparing samples in a period with samples in another/different period (column 6, lines 22-28), furthermore the correlation value is generated by comparison of samples of a period with samples in another adjacent period (abstract; column 6, lines 56-67 "adjacent means previous or after"), and a control signal to control the functions of the system (figure 10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use the same carrier or sub-carrier as taught by Gummadi in Awater system to transmit the signals in order to get same modulation and demodulation for the signals of different symbols, and generate a correlation value by comparing adjacent period samples i.e. a period previous to first one or by comparing a period next to first one in order to see the presence of sequence boundary more rapidly and to make more reliable interference rejection.

Regarding item (2) above, Barton in the same field of endeavor discloses a system and method for synchronizing OFDM signal where the timing of the signal is adjusted to according to the conditions to get synchronization (figures 3-5; column2, lines 30-40; column 3, lines 18-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use adjust the timing of the boundary by using the correlation values generated in Awater as taught by Barton in order to avoid the situation when adjusting the synchronization results in changing signal conditions, the complex values in the frequency bins at the output of the FFT suffer varying degrees of phase rotation, a subsequent channel estimator and corrector can handle these changes, this can result in a further increase of acquisition time and requires a significant amount of processing power, the signal boundary adjustment takes care of these problems and save the acquisition time and power.

Regarding Claims 2 and 15:

Awater discloses all of the subject matter as described above except for specifically teaching that the signals include a plurality of pilot and data signals.

However, Gummadi in the same field of endeavor discloses that the signal packets could be data signals and control signal i.e. pilot signals (column 1, lines 15-25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to transmit symbols including plurality of pilot signals and data signals in Awater. One would have been motivated to include plurality of pilot signal and plurality of data signals in the symbols in order to get the real data send with the related control or reference information as well.

Regarding Claims 3 and 16:

Awater discloses all of the subject matter as described above, and further discloses that the signal packets comprises sync bits i.e. a pilot signals (paragraph 0037), but doesn't explicitly disclose that the first, second, and third signals are different or not same.

However, Gummadi in the same field of endeavor discloses that the signals of periods are not same or they are different (figures 8a-c; column 8, lines 7-17).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to transmit different pilot signals for first, second, and third symbols in Awater. One would have been motivated to include different pilot signal in the symbols in order to get the related control or reference information.

Regarding Claims 5 and 18:

Awater discloses all of the subject matter as described above, but doesn't explicitly disclose that first, second, and third signals are data signals.

However, Gummadi in the same field of endeavor discloses that the system is determining boundary between sequences of digital data streams (column 2, lines 1-5; sequences of data is interpreted as the signals are data signals).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to transmit symbols including all data signals as taught by Gummadi in Awater system in order to transmit the required information in the form of data as the all data signals contains more information.

Regarding Claims 6 and 19:

Awater discloses all of the subject matter as described above, and further discloses that the signal packets comprises sync bits i.e. pilot signals (paragraph 0037), but doesn't explicitly disclose that the corresponding first, second, and third signals are the same.

However, Gummadi discloses that the signals of periods could be all the same or they are matched (figures 8a; column 8, lines 1-6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to transmit same pilot signals for first, second, and third symbols as taught by Gummadi in Awater system. One would have been motivated to include all the same pilot signals in the symbols in order to get the same timing and control information.

Regarding Claims 7 and 20:

Awater discloses all of the subject matter as described above, and further discloses that the first correlator comprises;

a. a conjugating unit for computing the conjugating value of first data (figures 5, and 7; paragraph 0047);

b. multiplying unit for multiplying conjugated data with second data for generating product value (figures 5, and 7; paragraph 0047);

c. correlation value computer generating correlation value according to product value i.e. an adder (figures 5, and 7; paragraph 0047).

Regarding Claims 9 and 22:

Awater discloses all of the subject matter as described above, and further discloses that the correlation value is calculated based on square of the absolute value and then the squared values are added in a summation unit (paragraphs 0037, and 0056).

Regarding Claims 10 and 23:

Awater discloses all of the subject matter as described above, and further discloses that the second correlator used for generating second correlation value comprises;

a. a conjugating unit for computing the conjugating value of first data (figures 5, and 7; paragraph 0047);

b. multiplying unit for multiplying conjugated data with the adjacent data(third data) for generating product value (figures 5, and 7; paragraph 0047);

c. correlation value computer generating correlation value according to product value i.e. an adder (figures 5, and 7; paragraph 0047).

Regarding Claims 12 and 25:

Awater discloses all of the subject matter as described above, and further discloses that the correlation value is calculated based on square of the absolute value and then the squared values are added in a summation unit (paragraphs 0037, and 0056).

7. Claims 8, 11, 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awater et al. (US 2005/0152317) in view of Gummadi et al. (US 7,136,436) and further in view of Barton et al. (US 7,227,834) as applied to claims 1, 7, 10, 14, 20, and 23 above, and further in view of Narasimhan (US 7,218,691).

Regarding Claims 8 and 21:

Awater discloses all of the subject matter as described above and further discloses that the correlation value calculation includes a summation unit or an adder (figures 5, and 7; paragraph 0047), but doesn't explicitly discloses that the correlation is based on the absolute value of the product.

However, Narasimhan in same field of endeavor discloses a similar method and apparatus for estimating the timing of OFDM symbol by generating a correlation value with comparison of sum of correlation with a prior and a subsequent value (abstract; figure 8; column 2, lines 48-54), and further discloses that the correlation value is generated based on the sum of absolute values (column 2, lines 35-47).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use and absolute value calculating unit as taught by Narasimhan in

Awater system to generate the correlation value in order to quantize the sign bits of the received signal.

Regarding Claims 11 and 24:

Awater discloses all of the subject matter as described above and further discloses that the correlation value calculation includes a summation unit or an adder (figures 5, and 7; paragraph 0047), but doesn't explicitly discloses that the correlation is based on the absolute value of the product.

However, Narasimhan in same field of endeavor discloses a similar method and apparatus for estimating the timing of OFDM symbol by generating a correlation value with comparison of sum of correlation with a prior and a subsequent value (abstract; figure 8; column 2, lines 48-54), and further discloses that the correlation value is generated based on the sum of absolute values (column 2, lines 35-47).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use and absolute value calculating unit as taught by Narasimhan in Awater system to generate the correlation value in order to quantize the sign bits of the received signal.

8. Claims 4, 13,17, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awater et al. (US 2005/0152317) in view of Gummadi et al. (US 7,136,436) and further in view of Barton et al. (US 7,227,834) as applied to claims 1-3, and 14-16 above, and further in view of Mui (US 6,690,739).

Regarding Claims 4 and 17:

Awater disclose all of the subject matter as described above, except for specifically teaching that the value of first, second, and third signals are predetermined.

However, Mui in the same field of endeavor discloses a similar method and system for intersymbol interference compensation, and further discloses that the encoded sequence of symbols is a set of predetermined values (abstract; column 2, lines 5-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use the first, second, and third signals with predetermined values in Awater in order to get at the receiver end the predetermined control or reference information.

Regarding Claims 13 and 26:

Awater disclose all of the subject matter as described above, except for specifically teaching using an equalizer and a slicer for equalizing and then slicing the second symbol.

However, Mui in the same field of endeavor discloses a similar method and system for intersymbol interference compensation, and further discloses using an equalizer and a slicer in the inter symbol interference compensation decoder (figure 18; column 31, lines 18-57).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use the equalizer and the slicer in Awater to equalize the second symbol and then slicing the symbol to generate a signal in order to cancel the intersymbol or multipath interferences in the signal. Similarly, one of ordinary skill in the art would use an equalizer and a slicer for the third symbol to generate third signal.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hirdepal Singh whose telephone number is 571-270-1688. The examiner can normally be reached on Mon-Fri (Alternate Friday Off)8:00AM-5:00PMEST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HS
December 17, 2007

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SUPERVISORY PATENT EXAMINER